THE

AMERICAN JOURNAL

OF THE MEDICAL SCIENCES.

NOVEMBER, 1904.

A CASE OF DISLOCATION OF THE ATLAS,

SHOWN BY A SKIAGRAM, CAUSING PARALYSIS OF THE LEFT ARM AND THE SYRINGOMYELIC DISSOCIATION SYMPTOM ON THE OPPOSITE SIDE.

BY JAMES HENDRIE LLOYD, A.M., M.D.,
OF PHILADELPHIA.

SOME years ago I put on record two cases of trauma of the cervical region of the spinal cord simulating syringomyelia.[1] These cases were illustrated with photographs, and eventually postmortem findings were reported in both of them. By a coincidence each of these patients had sustained two severe accidents quite dissimilar in type, and these accidents had resulted in fracture and dislocation of some of the cervical vertebræ, with marked deformity of the neck. Both cases had been of a goodly number of years' duration.

The fact of special interest in those two cases was the close similarity which they presented to the now well-known and classical picture of syringomyelia. Syringomyelia was not quite so well known ten years ago as it is now; and in fact, although here in Philadelphia we had been fairly prompt in recognizing and recording some cases of it, the disease was still rare enough to be interesting. A case of my own in 1893 was one of the first published in America with full microscopic findings. My recollection is that the disease was not much talked of nor widely recognized in this country before

---

[1] Traumatic Affections of the Cervical Region of the Spinal Cord Simulating Syringomyelia, Journal of Nervous and Mental Disease, June, 1894, p. 345. A Study of the Lesions in a Case of Trauma of the Cervical Region of the Spinal Cord Simulating Syringomyelia, Brain, 1898, xxi. p. 21. A Study of the Lesions in a Second Case of Trauma of the Cervical Region of the Spinal Cord Simulating Syringomyelia, Journal of Nervous and Mental Disease, February, 1900, p. 65.

1892 and 1893, although it was known in a general way from the reports of a few European observers, especially Leyden, but regarded rather as a pathological curiosity. Gowers' first edition, published in 1886, contains a fairly good anatomical description, but a very inadequate clinical account. In Bruhl's monograph on syringomyelia, printed in 1890, there is a noteworthy scarcity of American names in the extensive bibliography, not because of French indifference to American work, but because very little American work in this field had been done. Van Gieson, of New York, had published some autopsical findings in 1889, and he was probably the first American in the field with a microscope. Mere clinical reports of a few cases that may have been syringomyelia had been made by a few American observers, but they had not been confirmed, by autopsy.

I mention these few facts merely to show how little had been seen at that time of what I may call the syringomyelic syndrome; certainly it was a rare thing, if not unprecedented, to find this syndrome in two cases, both of them due to trauma, and neither of them presenting a cavity formation in the cord.

But a further and special point of interest in those two cases was in the fact that they both presented lesions which were partially unilateral, that is, of a unilateral type, and this fact led to some interesting conclusions on the subject of sensory conduction in the spinal cord.

The observations, briefly stated, were as follows: The dissociation symptom, or rather the thermoanæsthesia and analgesia, were present on the side *opposite* the main lesion, while tactile anæsthesia, with involvement of the motor tracts, was present *on the side* of the lesion. This was so in both those cases. I discussed at length, in my reports of those two cases, the grounds for supposing that these symptoms indicated that the fibres for the heat and cold senses and for pain, passing in by the posterior roots, decussate in the gray matter and pass upward in the anterolateral tracts of the opposite side, while the fibres for simple touch pass up in the posterior columns without decussating. This seems to be the obvious explanation of the symptoms. It suggests also that our conception of the Brown-Séquard syndrome will have to be modified to the extent of recognizing that tactile anæsthesia and thermoanæsthesia and analgesia are not of necessity present on the one side, but on opposite sides. These reasons in detail it is hardly necessary to repeat here; they can be read in the original papers.

The case which I have to put on record in this paper presents some points of marked resemblance to the other two, and also one or two features that seem to be quite unique. The man has been under my care in the Methodist Hospital for several months, and, as in the other cases, he has suffered from not only one but two very severe and successive injuries. I am indebted to Dr. Imboden, the resident physician, for clinical notes.

J. W., aged twenty-one years, admitted January 12, 1904. Born in Philadelphia and has resided here during entire life. Uses tobacco in moderation, but alcohol to excess.

Previous Medical History. So far as he knows he never had any of the usual diseases of childhood except pertussis.

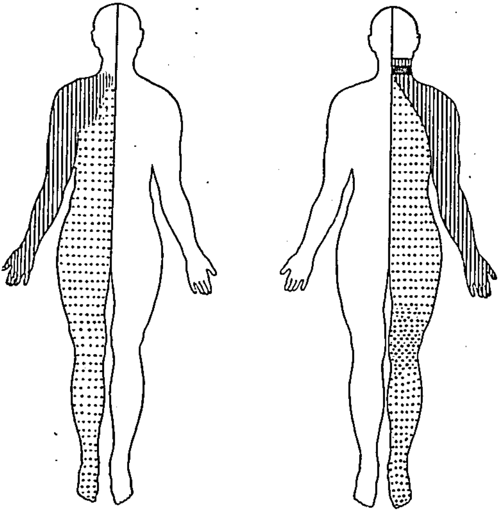
Previous Surgical History. When thirteen years of age he bruised the left leg below the knee while riding a bicycle, and this accident required the removal of some necrotic bone in this region. On the 16th of September, 1903, he had been drinking quite heavily in the morning, and while driving on a cart he fell off during an attempt to check the horse, which had become somewhat unmanageable. He struck on his left shoulder, the cart-wheel passing over the back of his neck. He was unconscious for an indeterminate period, being brought into the surgical dispensary of the Methodist Hospital, and a fracture of the jaw was diagnosed, but no spinal injury was recognized. He was sent to the surgical ward and remained there twelve days, and after his discharge he continued to come to the dispensary and was treated for an abscess of the jaw, presumably a result of infection through the mouth incident to or as a result of the fracture of the jaw. During all this time he was unable to turn the head without at the same time rotating the shoulders, and there can be little doubt that his spine had been injured in this first accident.

On January 12, 1904, about four months after the first accident, while the man was walking on a slippery sidewalk, both feet slid from under him and he fell on the left shoulder, striking the back of his head on the sidewalk with great force. This rendered him unconscious for about five minutes, and when he regained consciousness he was unable to move any of his limbs. This inability (motor) lasted for about half an hour, after which he slowly gained power, first in the legs and then in the right arm, but none returned in the left arm. As the man was unable to stand, the patrol was sent for and he was brought to the dispensary, where it was found that when he attempted to stand he would totter and fall if some one did not catch him. The patient stated that when he was trying to stand his back felt like a piece of paper, and it seemed to him that his spine was "*wabbling about.*" A rough test showed tactile sensation to be intact in all limbs, but practically no motor ability in the left arm. After remaining in the surgical ward for a short period, the patient was transferred to my care in the medical ward. His condition was as follows:

The patient had a marked deformity in the neck. The head was twisted to one side and slightly rotated, and the deformity was most prominent on the left side. With a finger in the pharynx the deformity could also be felt as a projecting mass on the posterior wall of that cavity. The head was held in a very rigid and unnatural position, but there was no complaint of pain.

Motor Symptoms. The patient was paralyzed in the left upper extremity. He could not move the left arm at all, but he could flex and extend the forearm at the elbow. He could neither pronate nor supinate the forearm. He could flex and extend the thumb and index finger, but could not flex the middle, ring, or little finger; neither could he separate the fingers. The electric reaction in the affected muscles was not significant except in the deltoid and pectoralis, in which the faradic contractility was slightly diminished. There was no atrophy of the muscles, nor fibrillation. There was no paralysis in the left leg, a fact which is important, nor in the right arm or leg. There was no paralysis of the bladder or rectum. There was no involvement of the spinal accessory nerve, nor of the phrenic nerve, nor of any muscles of respiration. In fact, pressure symptoms were remarkable for their absence.

FIG. 1.



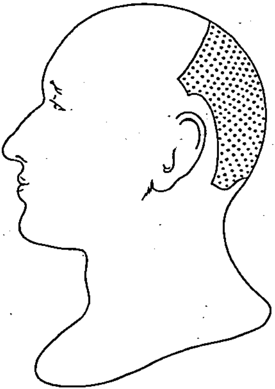
Thermoanæsthesia and analgesia on the side opposite the paralysis of motion.

Sensory Symptoms. There was very marked loss of thermic sense in the *right* arm and forearm (that is, on the side opposite the motor paralysis). The thermic sense was confused in the remaining parts of the right side, extending from the region of the fourth cervical vertebra. There was also analgesia of the entire *right* side from the region of the fourth cervical vertebra, also more pronounced in the arm and forearm.

Above the fourth cervical vertebra was an area one inch wide, which was hyperæsthetic; above this zone sensation shaded rapidly to normal.

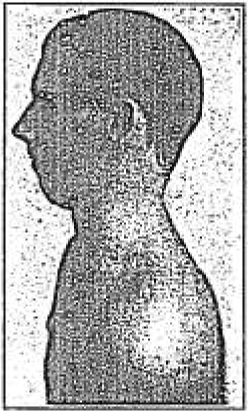
There was no tactile anæsthesia anywhere, either on the left or right side. All these tests were made with great care, and suggestion was avoided as much as possible. The patient never exhibited any of the stigmata of hysteria, and these sensory disturbances were not transferable. There remains, however, to note one sensory disturbance which may possibly be of great significance. This was a distinct area of tactile anæsthesia in the region of the distribution of the great occipital nerve of the left side. The great occipital nerve comes off from the second cervical nerve, and this second cervical nerve emerges from the spinal canal between the atlas and the axis. The involvement of this nerve, in view of what is shown by the skiagram, is significant, and is possibly the most important localizing symptom in the case.

FIG. 2



Anæsthesia in the area of the great occipital nerve.

FIG. 3.



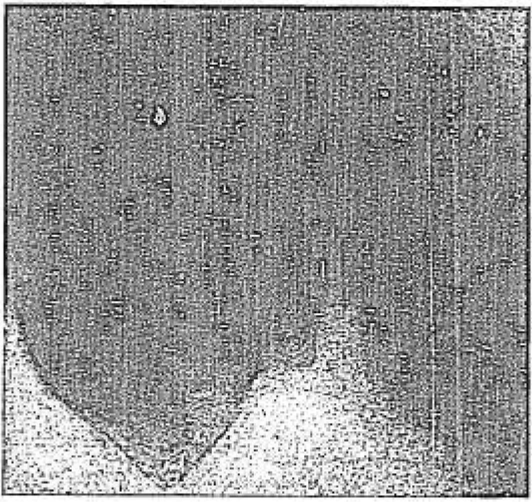
Case of dislocation of the atlas.

The patient's sensory symptoms improved during his stay in the hospital, and eventually almost disappeared, but the motor paralysis in the left arm and forearm has persisted, and the deformity in the cervical region is unchanged.

The interpretation of the symptoms in this case has not seemed to me altogether easy.

The skiagram, which I exhibit, shows that the lesion is very high, and in fact the atlas appears to be displaced. The vertebræ below it, beginning with the axis, are in place, as is shown quite clearly by the relative positions of their spinous processes and by the distinctness of the intervertebral spaces. I have therefore taken the liberty of calling it a case of dislocation of the atlas, although I am fully aware that this is usually considered to be promptly fatal. Certainly it is difficult to conceive how the atlas can be dislocated and immediate pressure not occur on vital regions of the cord. But I call particular attention to the fact that displaced vertebræ can be felt in the pharynx, although by mere digital examination it is of course not possible to say what vertebra or vertebræ this may be. But

FIG. 4.



Skiagram of dislocation of the atlas.

it must necessarily be high in the neck, for only the first four, possibly five, cervical vertebræ can be reached by a finger in the pharynx. A symptom of especial localizing value is the anæsthesia in the distribution of the great occipital nerve. This clearly indicates a high lesion, for the great occipital nerves are branches of the second pair of cervical nerves, and these pass out between the atlas and the axis.

The motor paralysis of the left arm alone is extremely difficult to account for. The brachial plexus passes off far below the apparent level of the lesion, and the fact that the leg is not involved shows that the arm paralysis is not due to pressure on the lateral tract. Again, the arm paralysis is of the peripheral type, as would be due to a lesion of the anterior nerve roots, for there is some muscular atrophy with faradic changes.

FIG. 5.

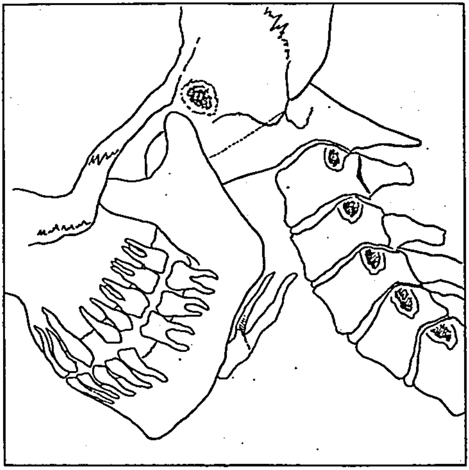
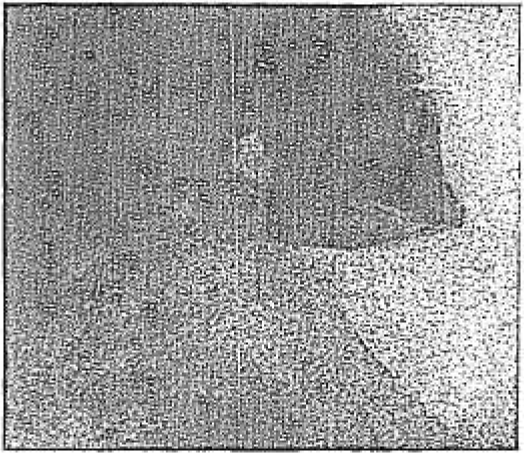


Diagram showing the tilting forward of the head in front of and slightly off of the vertebral column. The drawing is necessarily diagrammatic in the region of the atlas, as the details do not appear clearly in the skiagram.

The sensory symptoms seem to indicate a very localized pressure on the anterolateral region; that the posterior columns are not involved is shown by the absence of tactile anæsthesia.

Dr. Walton, of Boston, has recently reported several cases of dislocation of the cervical vertebræ, and has very clearly pointed out their mechanism. A displacement of the articular surfaces of two adjoining vertebræ, with only a slight forward dislocation of the bone on one side, can cause such a deformity as this patient has without much if any pressure on the cord. Such dislocations have been successfully reduced, and have even reduced themselves spontaneously during sleep or during ether anæsthesia. But in case of the atlas we have to reckon with the odontoid process of the axis. The query arises, Could this odontoid process be fractured and allow the atlas to slip? Finally, Can there be two lesions, one of the atlas and one lower in the spine involving the anterior roots, that go to form the brachial plexus? The fact that a dislocation of the atlas may occur, and the patient continue to live for weeks and even years, is proven by several well-authenticated cases. The following references are to some of these cases.

FIG. 6.



Skiagram of normal skull and spinal column.

Handyside[1] described a case of *spontaneous* dislocation of the *processus dentatus*, with ankylosis of the upper part of the spine, and unattended with any symptom of paralysis. This case came on during a severe attack of rheumatic fever, and its causation was obscure. There was no caries. This man lived ten years and worked at his forge. He died very suddenly with asphyxia. At the autopsy the right inferior articular surface of the atlas was found dislocated downward and forward over the corresponding articular surface of the axis, and ankylosed. There was also ankylosis of the occipital bone to the atlas. The spinal canal was reduced to a space measuring two lines in some diameters, and the lower part of the medulla oblongata was compressed.

---

[1] Edinburgh Medical Journal, 1840, vol. liii. p. 876.

Stanley[1] reported a case of long-standing ankylosis of the five superior cervical vertebræ, with dislocation of the atlas. The clinical history is obscure, but the patient was a sailor, who continued at his work. He died as the result of an accident, and the autopsy was carefully reported.

FIG. 7.

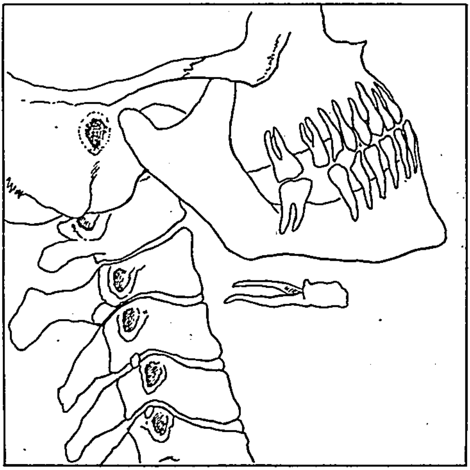


Diagram of the normal skull and spinal column in place.

Debenham and Hutchinson[2] reported a most important case of a man who dislocated the atlas and sustained a fracture of the odontoid process of the axis, and yet lived two years. The diagnosis was confirmed by autopsy. The atlas with the included odontoid process was dislocated half an inch forward and a little to the left side. The odontoid process had been broken through the base, and was ankylosed to the atlas and to the front of the axis in its new position. The lower articular parts of the atlas, pushed forward and downward, were ankylosed to the front surfaces of the axis, and the axis and third vertebra were also ankylosed. The displacement of the atlas forward was such that its posterior arch crossed the spinal canal and left the greater part of the canal behind it. The portion of the canal in front and through which the cord passed did not admit the tip of a child's little finger. It measured the third of an inch from behind forward and three-quarters of an inch from side to side. The cord must have been much compressed. This patient was eventually paralyzed in motion and sensation, but only gradually so. The clinical report was very inadequate. It is likely that the displacement, after the original injury, did not take place all at once, but by degrees, thus leaving the cord to adjust itself to the pressure.

---

[1] Edinburgh Medical Journal, 1839, vol. li. p. 563.

[2] Report of London Hospital, 1867, 1868, vol. iv. p. 210.

Wyman[1] had a specimen from a dissecting-room subject of whose history nothing was known. It was a case of fracture and dislocation of the anterior fragment of the axis, with ankylosis of the axis and third and fourth vertebræ. Evidently of long standing.

Stimson,[2] quoting Gurlt, recognizes that fracture of the atlas is not necessarily fatal, for in Gurlt's eleven cases immediate death occurred in only two cases, and in only two others did death occur within an hour. One case survived thirteen days.

As to *dislocation*, falling of the head forward is a symptom. Coste's patient lived more than five months, and yet the spinal canal was reduced to a slit 5 mm. wide on the left and 2 mm. on the right. (Coste's case is reported in the *Journal de Bordeaux*, August, 1852; not attainable.)

Stimson speaks of a "bilateral dislocation in opposite directions," in which one articular surface is displaced forward and the opposite backward. This displacement can exist without causing compression, although in Sédillot's case,[3] which is cited as an example, the patient died in seven weeks with symptoms of compression.

Phillips reports a case[4] in which the posterior arch of the atlas was broken off and remained in place, while the anterior portion, carrying with it the fractured odontoid process, was displaced so that it lay entirely in front of and became united with the body of the axis. The patient survived forty-seven weeks.

In Dubreuil's case the patient lived until the seventh day; in Gibson's case until the seventh day. Stimson calls attention to the falling forward of the chin on the chest, and to prominence in the pharynx, and deformity at the back of the neck.

Scudder[5] says that by palpation through the mouth the bodies of the cervical vertebræ may be felt as low as the fifth cervical vertebra. He also says that unilateral dislocation is the most common form, one articular process slipping over and in front of the one below. This causes the head to tilt and rotate.

---

[1] Boston Medical and Surgical Journal, 1862, vol. lxv. p. 333.

[2] Fractures and Dislocations, 1899.

[3] Gaz. med., 1842, p. 776.

[4] Med. Chir. Trans., vol. xx. p. 78.

[5] Treatment of Fractures, Philadelphia, 1903.

The above cases do not by any means exhaust the literature of the subject, which is quite extensive, as may be seen by reference to the *Index Catalogue.* Most of the literature, however, refers to cases which have been immediately or quickly fatal, and these of course are the most common. I have thought it worth while merely to collect a few cases in which the patients have survived the accident for a comparatively long time.[1] The opinion that a dislocation of the atlas, as a result of accident, is necessarily quickly fatal, is thus seen to be erroneous. No reference has been made here to cases of caries of the bone, causing displacement, a quite well-known instance of which is related by Mr. Hilton in his treatise on *Rest and Pain.*

VENEREAL WARTS.

THEIR ETIOLOGY, PATHOLOGY, DIAGNOSIS, AND TREATMENT.

By C. W. G. Rohrer, B.Sc., M.D.,
DEMONSTRATOR OF PATHOLOGY, COLLEGE OF PHYSICIANS AND SURGEONS, BALTIMORE, AND IN THE MEDICAL DEPARTMENT OF THE UNIVERSITY OF WEST VIRGINIA.

(From the Pathological Laboratory of the College of Physicians and Surgeons and the Genito-urinary Clinic of Professor Charles F. Bevan.)

Various terms are in use to designate this pathological condition. A tolerable acquaintanceship with them may prove helpful to the student of venereal diseases. The following serve as examples: verrucæ venereæ; verrucæ of the penis; excrescences; warts; cutaneous tumors; papillomata; condylomata; sycomata; vegetations; venereal vegetations; papillary excrescences; papillary fibromas; acuminate warts; multiple pointed condylomata; *Feizwarzen* ("fig warts"); *Feuchtwarzen* ("moist warts").

The origin of these terms is not definitely known. However, it is fair to assume that the nature and character of the growths, as well as their common seat, gave to them "a local habitation and their name."

Definition. Moist or dry papillary overgrowths, varying in size and number, acuminate or flattened, sessile or pedunculated, appearing usually upon the mucocutaneous surfaces of the male and female genitalia. They are also found upon the scrotum, and

---

[1] Other references are: Shaw, Med. Chir. Trans., vol. xxxi. p. 289; Lawrence, ibid., vol. xiii. p. 387.